

Remarks

1. Introduction

Claims 16-29 are pending.

2. Rejection based on Charvin reference

The Office Action rejected claims 16-18, 21-26, and 28-29 under 35 U.S.C. §102(b) as being anticipated by Charvin et al. (U.S. Patent No. 4,706,596). The Office Action rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Charvin et al.

The booster actuator of the present invention has independence between the force input member and the force output member. As shown in Figure 2 of the present application, the cam shaft or force input member 28 moves independently of the force output member 30 as the output member moves from the initial output position to the activated output position. A first feature of the invention is that there is thus no fixed mechanical connection between the output force desired and the input force required.

This feature of providing independence between the force input member and the force output member significantly enhances the versatility of the booster actuator. According to the present invention, the force output member is not dependent on any particular form of energy applied to the input member, thereby allowing the input force to be a mechanical, hydraulic, pneumatic or electrical power. The booster actuator of the present invention thus need not rely on a specific source of power to prevent unwanted operation.

Claims 16 and 21 each claim this feature. See claim 16 ("a force output member linearly movable relative to the body in response to movement of the force input member from an initial output position to an activated output position, the force output member being independently movable with respect to the force input member"); claim 21 ("a force output member movable relative to the body in response to movement of the force input member from an initial output position to an activated output position, the force output member being independently movable with respect to the force input

member"). The Office Action states that these limitations may be interpreted to cover independently moving the output member relative to the input member when the actuator is being reset. Applicants respectfully disagree. Viewing the limitation as a whole, including the preceding limitation of the force output member being moveable in response to movement from the force input member from an initial output position to an activated output position, the entire limitation requires independence upon actuation of the output member and does not encompass independence upon resetting.

A second significant feature of the invention is that the force input member moves relative to the body in direct response to the low energy input from an initial input position to an activated input position. In other words, energy is supplied to the booster actuator that moves the force input member only when movement is required, which is unlike the prior art. In the Charvin patent, the plunger ram is locked in place by a magnet, which requires an energy force, such as the disclosed umbilical, to hold the plunger ram in place.

The force exerted by a compression spring according to the invention to bias the booster actuator to the reset position and hold the input member in the unactivated position may be set very low to allow the input member to move with minimal resistance. This in turn allows various types of input drives, whether pneumatic, hydraulic, mechanical or electrical, to be used as the driving force to the input member.

The Charvin patent thus relies on a force being continuously exerted on a ram by a spring to move the ram to the actuated position. The ram is pneumatically fixed in the locked position but either mechanically coupling the ram head to a continuously powered electromagnet, or mechanically coupling the ram head to a permanent magnet. Removing power to the electromagnet or applying a disruptive electric current to the permanent magnet allows the ram to decouple. Operation is thus dependent upon the electrical energy. The system would have to be extensively revised to be adapted to a pneumatic, hydraulic, or mechanical force.

In view of the above, early allowance of the booster actuator is requested.

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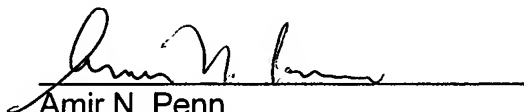
3. Double Patenting

The Office Action rejected claims 16-29 under as being unpatentable obviousness-type double patenting over claims 1-20 of U.S. Patent No. 6,722,216. Applicants will submit a terminal disclaimer concurrently with submission of the power of attorney.

4. Conclusion

Applicants respectfully submit that pending claims 16-29 are allowable. If any questions arise or issues remain, the Examiner is invited to contact the undersigned at the number listed below in order to expedite disposition of this application.

Respectfully submitted,


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